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10/649,456	08/27/2003	Cheng T. Horng	HT00-001B	5784

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EXAMINER

MILLER, BRIAN E

ART UNIT

PAPER NUMBER

2652

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/649,456

Applicant(s)

HORNG ET AL.

Examiner

Brian E. Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2003.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-20,22 and 24-28 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 15-20,22 and 24-28 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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Claims 15-20, 22, 24-28 are now pending after the paper filed on 8/27/03 canceled claims 1-14, 21 & 23.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “substrate” and the “interrupt layer,” as recited in claim 15 and the “substrate” and “capping layer” as claimed in claim 24, the “conducting lead layer is a three layer lamination” as recited in claim 20, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The abstract of the disclosure is objected to because it is not directed to the now claimed invention. The Abstract is directed to a “method”, however the claims are directed to a product. Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities: (a) page 1 under “Related Patent Application” reference to the application should include complete and updated information. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 15-20, 22, 24-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. (a) In each of claims 16, 19, 22, 25 & 28, the recitation of the thickness of a layer, e.g., “being preferably 100A, but which could be between 50A and 150A” (claim 16) is indefinite. The metes and bounds of the claim(s) cannot be ascertained since it is not readily apparent what thickness is needed to meet the claim language; (b) claims 15 & 24, the “preamble” includes the word “comprising” twice, such that the metes and bounds of the claim cannot be readily ascertained. More specifically (for example), claim 15, line 3 recites “a laminated longitudinal bias layer of hard magnetic material” and also line 11 there is recited “which is formed a layer of hard magnetic material; and line 4 “a laminated conducting lead layer” and line 13 is recited “a conductive lead layer, laminated.” The above language makes it

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unclear on how many hard magnetic layers and lead layers exist in the structure, rendering the claim indefinite. (b) Similar language also is recited in claim 24 and the claim is similarly defective. Additionally, claim 24, lines 4-5 recites “a laminated conducting lead layer” however, only one “layer” has been recited-see claims 26-27; (c) Claims 15 & 24 are further defective as as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the sequential layer structure such as which layer should be provided on which subsequent layer, etc. For example, the substrate (claims 15 & 24) and the capping layer (claim 24) are basically not connected to any other structure which renders the claim incomplete; (d) claims 16 & 25, the language “wherein the laminated hard magnetic underlayer comprises a seed double layer of Ta/Cr” is misdescriptive, as it is not readily apparent whether this seed layer is in addition to the Ta/Cr layer recited in claim 15 (or 24, respectively).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 15-19, 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinarbasi (US 6,219,207) in view of Pinarbasi (US 6,219,207). In so far as the claims are definite and understood, (as per claims 15 & 24) Pinarbasi '207 discloses a spin valve type magnetoresistive read element 400 (700) for reading high recorded density, as shown mainly in FIGs. 14 & 17, high RPM magnetic disks, comprising: a substrate 234; a spin valve type sensor element 210; a laminated hard magnetic underlayer comprising a Ta/Cr seed layer upon which is formed a layer of hard magnetic material 230; an "interrupt" layer 308 (708); a conductive lead layer 310, 406 (710, 706), laminated so as to provide specular reflection of conduction electrons and formed over said "interrupt" layer.

The above head structure includes a Cr seed layer 232 upon which the hard magnetic layer 230 is formed, however, is silent as to a dual seed layer structure of Ta/Cr. Pinarbasi '210, however, discloses a spin valve head structure (as shown in FIGs. 14 & 15) such that FIG. 14 discloses a single seed layer Cr 402 and FIG. 15 shows a double seed layer structure of 502, 504 of Ta/Cr.

From this teaching, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the seed layer 232 of Pinarbasi 207, to have employed a laminated "double" seed layer of Ta/Cr as taught by Pinarbasi '210 (see col. 6, lines 20-32).

The motivation would have been: having the second seed layer of Ta (504) would have improved the texture of the first seed layer (502) which would have further improved the microstructure of the layer positioned above the first seed layer (see col. 6, lines 38-44). These advantages would have been readily realized by a skilled artisan.

(As per claims 16 & 25) wherein the laminated hard magnetic underlayer comprises a seed

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double layer of Ta/Cr (as described above), the thickness of the Cr layer being between 50 Å and 150 Å (see Pinarbasi '210, col. 5, lines 53-57), upon which Ta/Cr seed layer a layer of hard magnetic material such as CoPtCr or CoPt (e.g. CoPtCr), is formed to a thickness between approximately 150 Å and 500 Å (e.g. 200 Å-see Pinarbasi '207 FIG. 14 or 17). While it is noted that the exact thickness of the Ta layer being in the range between 30 Å and 75 Å is not explicitly taught, it would have been obvious to have provided such thickness. One having ordinary skill would have readily provided appropriate thicknesses for proper operation of the head through routine engineering optimization and experimentation, lacking any unobvious or unexpected results to the claimed thicknesses; (as per claims 17 & 19) wherein the "interrupt" layer is a layer of Ta material 308 (708) which has a known amorphous structure, having a thickness of between 30 Å and 75 Å (see Pinarbasi '207, e.g., 35 Å), such that it would follow that the aforementioned "interrupt" layer would orient the crystal plane of a layer formed upon it in a direction parallel to the plane of that layer.

With respect to claim 24, it is noted that while the "interrupt" layer limitation of claim 15 is not present, an additional "capping layer" is recited. Official Notice is taken that capping layers of known materials (and appropriate thicknesses) including Cr (claim 28) were notoriously old and well known in this art, and providing such would have been routinely provided by a skilled artisan. Capping layers are known to provide protection, e.g., preventing oxidation, of previously deposited layers, as was conventionally known in the art.

9. Claims 26 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinarbasi '207 in view of Pinarbasi '210 as applied to claim 24 above, and further in view of Pinarbasi (US

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6,460,243). Pinarbasi ('207 and '210) do not disclose the use of the conductive material being Rh or Ir, however, Pinarbasi '243 discloses the use of a Rh lead 146 adjacent a hard bias layer 144 in the read sensor 72 as shown primarily in FIG. 11. It is understood that Rh and Ir would have similar conducting characteristics, such that it would have been considered obvious to have substituted either for the conducting layer of Mo or Ta (as taught in Pinarbasi '207). The thicknesses of the layers would have been readily provided through routine engineering and optimization. Furthermore, it has been held to be within the general skill of a skilled artisan to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice; See *In re Leshin*, 125 USPQ 416 (CCPA 1960).

Allowable Subject Matter

10. Claims 20 & 22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian E. Miller whose telephone number is (703) 308-2850. The examiner can normally be reached on M-TH 7:15am-4:45pm (and every other friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "B. E. Miller", written in a cursive style.

Brian E. Miller
Primary Examiner
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BEM
January 10, 2005